

made during the month as follows: 3d to 9th, cloudy. 10th, two small spots first observed two days in on east limb; this group was breaking up on the 11th. 12th and 13th, cloudy. 14th, clear disc. 18th, one spot in south latitude just past meridian; also one spot in north latitude one day in on east limb; both in view on the 20th. 21st to 24th, cloudy. 25th, clear disc. 26th, one small spot one day past meridian, which had disappeared on the 27th. 28th to 31st, clear disc.

Mr. M. A. Veeder, Lyons, N. Y.: May 5th, faculæ, that appeared by rotation April 22d, was at the western limb. 7th, faculæ and small spots appeared by rotation; the spots underwent many changes and faded out during the transit; the faculæ in their location was seen at the western limb on the 21st. 11th, small spots, not previously seen, were near the western limb. 16th, two spots appeared by rotation but had faded out on 21st and were not seen again. 18th, small spots and some faculæ were at the eastern limb. 26th, a spot, probably in the location of this disturbance, was seen, and

on the 31st the faculæ in its vicinity was at the western limb. On the 18th a group of faculæ not previously seen was at the western limb. During the month solar disturbances were quite numerous but very evanescent.

Mr. John W. James, Riley, Ill.: observations were taken on the 1st, 2d, 6th, 7th, 8th, 10th, 11th, 14th, 16th, 17th, 18th, 20th, 21st, 23d, 25th to 31st, inclusive, but the only spots seen were one group, two days from eastern edge of disc, on the 10th, which was gone on the 14th, and a spot two days from western edge, 18th, which had disappeared, 21st.

Mr. H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 8th, 10th, 11th, and 12th.

#### PRAIRIE AND FOREST FIRES.

Prairie fires were reported near Fort Buford, N. Dak., on the 1st, 2d, 3d, 7th, and 8th, and a large field fire was reported near Los Angeles, Cal., on the 19th.

Forest fires were reported on the 5th at New Richmond, Wis., and near Stillwater and Red Lake Falls, Minn.

## VERIFICATIONS.

### FORECASTS FOR 24 HOURS IN ADVANCE.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast Division.]

The forecasts for districts east of the Rocky Mountains for May, 1890, were made by 2d Lieutenant W. A. Glassford, Signal Corps, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps.

Percentages of forecasts verified, May, 1890.

| States.                   |      | States.                           |      |
|---------------------------|------|-----------------------------------|------|
| Maine.....                | 71.2 | Kentucky.....                     | 79.8 |
| New Hampshire.....        | 77.2 | Ohio.....                         | 85.7 |
| Vermont.....              | 76.5 | West Virginia.....                | 81.9 |
| Massachusetts.....        | 81.9 | Indiana.....                      | 87.0 |
| Rhode Island.....         | 78.1 | Illinois.....                     | 86.9 |
| Connecticut.....          | 77.7 | Lower Michigan.....               | 77.7 |
| Eastern New York.....     | 74.5 | Upper Michigan.....               | 75.9 |
| Western New York.....     | 88.2 | Wisconsin.....                    | 75.7 |
| Eastern Pennsylvania..... | 77.5 | Minnesota.....                    | 71.0 |
| Western Pennsylvania..... | 86.7 | Iowa.....                         | 81.4 |
| New Jersey.....           | 77.2 | Kansas.....                       | 79.4 |
| Delaware.....             | 83.5 | Nebraska.....                     | 81.2 |
| Maryland.....             | 83.0 | Missouri.....                     | 86.3 |
| District of Columbia..... | 85.2 | Colorado.....                     | 76.3 |
| Virginia.....             | 84.5 | North Dakota.....                 | 68.8 |
| North Carolina.....       | 82.0 | South Dakota.....                 | 78.6 |
| South Carolina.....       | 83.9 | Southern California*.....         | 85.3 |
| Georgia.....              | 84.0 | Northern California*.....         | 78.9 |
| Eastern Florida.....      | 87.9 | Oregon*.....                      | 82.6 |
| Western Florida.....      | 85.7 | Washington*.....                  | 80.9 |
| Alabama.....              | 80.2 | By elements: Weather.....         | 82.6 |
| Mississippi.....          | 78.3 | Temperature†.....                 | 77.7 |
| Louisiana.....            | 80.3 | Monthly percentage of weather and |      |
| Texas.....                | 86.1 | temperature combined‡.....        | 80.6 |
| Arkansas.....             | 78.8 |                                   |      |
| Tennessee.....            | 82.8 |                                   |      |

\* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for May, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

### FORECASTS FOR 48 HOURS IN ADVANCE.

Appreciating the great importance that long time predictions possess for the general public the Chief Signal Officer has

authorized forecasts for forty-eight and seventy-two hours, covering the second and third days in advance. Such forecasts are optional with the predicting officer, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 125; temperature, 51. Percentages of verifications: weather, 77.8; temperature, 70.2. Weather and temperature combined, 75.9.

No forecasts for seventy-two hours were made during the month.

#### CAUTIONARY SIGNALS FOR MAY, 1890.

Statement showing percentages of justifications of wind signals for the month of May, 1890:

**Wind signals.**—(Ordered by Lieutenant W. A. Glassford.) Total number of signals ordered, one hundred and fifty-four; justified as to velocity, wholly, eighty, partly, thirteen; justified as to direction, one hundred and twenty-nine. Of the signals ordered, one hundred and twenty-six were cautionary signals, of which sixty-six were wholly, and five partly justified, and twenty-eight were storm signals, of which fourteen were wholly, and eight partly justified. Forty signals were ordered for easterly winds, of which thirty-two were justified, and one hundred and fourteen were ordered for westerly winds, of which ninety-seven were justified. Percentage of justifications, 60.0.

No cold-wave signals were ordered during the month.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for May, 1890.

| States.        | Weather. | Temperature. | States.                     | Weather. | Temperature. |
|----------------|----------|--------------|-----------------------------|----------|--------------|
| Illinois.....  | 82.0     | 81.5         | Missouri.....               | 78.0     | 86.0         |
| Indiana.....   | 80.0     | 88.0         | New Jersey.....             | 77.5     | 89.9         |
| Kansas.....    | 75.5     | 84.3         | New York.....               | 84.0     | 88.2         |
| Kentucky.....  | 90.0     | 93.0         | North and South Dakota..... | 80.0     | 80.0         |
| Michigan.....  | 81.2     | 84.1         | Pennsylvania.....           | 83.0     | 89.0         |
| Minnesota..... | 63.0     | 70.0         | South Carolina.....         | 86.9     | 90.0         |

## STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for May, 1890, of the directors of the various state weather services:

### ALABAMA.

Temperature.—Highest monthly mean, 72.7, at Mobile; lowest monthly

mean, 64.9, at Guntersville and Chepultepec; maximum, 92, at Gadsden, 31st; minimum, 34, at Double Springs, 8th; greatest local monthly range, 57, at Double Springs; least local monthly range, 34, at Mobile.

**Precipitation.**—Greatest monthly, 10.19, at Montgomery; least monthly, 1.82, at Gunter'sville.—*Prof. P. H. Mell, Auburn, director; J. M. Quarles, Private, Signal Corps, assistant.*

#### ARKANSAS.

**Temperature.**—Highest monthly mean, 75.2, at Monticello; lowest monthly mean, 62.8, at Heber; maximum, 100, at Washington, 30th; minimum, 40, at Brinkley, 10th; greatest local monthly range, 54, at Lead Hill; least local monthly range, 32, at Dallas.

**Precipitation.**—Greatest monthly, 9.65, at Ozone; least monthly, 3.68, at Lonoke.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; W. U. Simons, Sergeant, Signal Corps, assistant.*

#### COLORADO.

**Temperature.**—The mean was about 0.5 below the normal of the last four years; highest monthly mean, 66.6, at Fruita; lowest monthly mean, 33.8, at Leadville; maximum, 93, at Fruita, 27th, and at Julesburg, 27th and 28th; minimum, 11, at Breckenridge, 13th; greatest local monthly range, 78, at Sunnyside; least local monthly range, 39, at Cumbres.

**Precipitation.**—The average deficiency was more than 80 per cent. below the normal of the last four years.

**Wind.**—Prevailing directions, north and west.—*Prof. F. H. Loud, Colorado Springs, director; W. S. Miller, Sergeant, Signal Corps, assistant.*

#### ILLINOIS.

**Temperature.**—Highest monthly mean, 65.6, at Golconda; lowest monthly mean, 52.8, at Riley; maximum, 96, at McLeansborough, 23d; minimum, 28, at Hennepin, 12th; greatest local monthly range, 64, at McLeansborough; least local monthly range, 43, at Golconda.

**Precipitation.**—Greatest monthly, 6.02, at Olney; least monthly, 2.56, at Beason.

**Wind.**—Prevailing direction, southwest.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

#### INDIANA.

**Temperature.**—The mean was 2.2 below the normal; highest monthly mean, 68.6, at Huntingburgh; lowest monthly mean, 52.1, at Valparaiso; maximum, 98, at Huntingburgh, 30th, and Rockville, 31st; minimum, 29, at Point Isabel, 2d, 8th, and 11th; greatest local monthly range, 59, at Angola; least local monthly range, 48, at De Gonia Springs.

**Precipitation.**—The average was about 0.50 above the normal; greatest monthly, 8.34, at Point Isabel; least monthly, 2.26, at Columbus.

**Wind.**—Prevailing direction, southwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

#### IOWA WEATHER AND CROP SERVICE.

**Temperature.**—The mean was 3.1 below the normal; highest monthly mean, 62.1, at Clarinda; lowest monthly mean, 52.2, at Cresco; maximum, 96, at Blakeville, 30th; minimum, 26, at Cresco, 7th; greatest local monthly range, 64, at Blakeville; least local monthly range, 49, at McCausland.

**Precipitation.**—The average was 0.80 below the normal; greatest monthly, 6.44, at McCausland; least monthly, 1.61, at Indianola.

**Wind.**—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Sergeant, Signal Corps, assistant.*

#### KANSAS.

**Temperature.**—Highest monthly mean, 69.9, at Monument; lowest monthly mean, 58.8, at Ellis; maximum, 110, at Gove City, 20th; minimum, 25, at Alton, 7th; greatest local monthly range, 77, at Eureka Ranch; least local monthly range, 43, at Buffalo Park; greatest daily range, 61, at Shields, 20th; least daily range, 7, at Concordia, 4th, and at State Agricultural College, 30th.

**Precipitation.**—Greatest monthly, 6.84, at Lebo; least monthly, trace, at Lisbon.

**Wind.**—Prevailing direction, south.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

#### KENTUCKY.

**Temperature.**—The average was 2.5 below the normal; maximum, 93, at Richmond, 29th; minimum, 32, at Harrodsburgh, 8th; greatest local monthly range, 59, at Harrodsburgh; least local monthly range, 88, at Millersburgh.

**Precipitation.**—The average for the month was about the normal; greatest monthly, 5.70, at Harrodsburgh; least monthly, 2.70, at Owenton.

**Wind.**—Prevailing direction, southwest.—*Dr. E. A. Grant, Louisville, director; S. P. Gresham, Private, Signal Corps, assistant.*

#### LOUISIANA.

**Temperature.**—The mean temperature was 1.5 below the normal; highest monthly mean, 75.2, at Hammond; lowest monthly mean, 69.8, at Cameron; maximum, 98, at Lake Charles, 29th; minimum, 40, at Port Gibson, Miss., 8th; greatest local monthly range, 55, at Cameron; least local monthly range, 16, at Port Eads.

**Precipitation.**—The average was 0.33 above the normal; greatest monthly, 11.54, at Luling; least monthly, 1.95, at Shreveport.

**Wind.**—Prevailing direction, south.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

#### MICHIGAN.

The features of the month were the low night temperatures of the first twenty days, and the excess in rainfall in the central portion of the state.

**Temperature.**—The mean was 5.4 below the normal of the last fifteen years; highest monthly mean, 57.2, at Bangor; lowest monthly mean, 38.7, at Atlantic; maximum, 92, at Benton Harbor, 30th; minimum, 20, at Crystal Falls, Chase, and Evart, 1st; greatest local monthly range, 67, at Ionia; least

local monthly range, 89, at Atlantic; greatest daily range, 44, at Mio, 2d; least daily range, 1, at Manistee, 3d.

**Precipitation.**—The average was 1.20 above the normal of the last fifteen years; greatest monthly, 6.90, at Chelsea; least monthly, 2.31, at Evans.

**Wind.**—Prevailing direction, southwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

#### MINNESOTA.

**Temperature.**—Highest monthly mean, 54.7, at Mankato; lowest monthly mean, 43.2, at Duluth; maximum, 90, at Red Wing, 30th; minimum, 14, at Moorhead, 1st; greatest local monthly range, 72, at Crookston; least local monthly range, 47, at Duluth; greatest daily range, 44, at Saint Vincent, 21st; least daily range, 2, at Duluth, 18th.

**Precipitation.**—Greatest monthly, 5.65, at Rolling Green; least monthly, 1.15, at Ortonville.

**Wind.**—Prevailing direction, northwest.—*John Healy, Corporal, Signal Corps, Saint Paul, in charge.*

#### MISSISSIPPI.

**Temperature.**—The mean was 1.4 below the normal; highest monthly mean, 74.8, at Pearlinton; lowest monthly mean, 64.8, at Hernando; maximum, 98, at Columbus, 12th; minimum, 38, at Aberdeen, 8th; greatest local monthly range, 55, at Vaiden; least local monthly range, 26, at Pearlinton. Light frost was reported in the eastern part of the state on the 8th.

**Precipitation.**—The average was 0.74 above the normal; greatest monthly, 7.76, at Holly Springs; least monthly, 0.47, at Hazlehurst.

**Wind.**—Prevailing direction, south.—*R. B. Fulton, Signal Corps, University, director.*

#### MISSOURI.

**Temperature.**—Highest monthly mean, 67.0, at Protom; lowest monthly mean, 56.0, at Kirksville; maximum, 96, at Protom; minimum, 32, at Fayette and Miami.

**Precipitation.**—Greatest monthly, 5.81, at Saint Louis; least monthly, 1.15, at Craig.—*Prof. Francis E. Nipher, Saint Louis, director.*

#### METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

**Temperature.**—Highest monthly mean, 68.4, at Willow Springs; lowest monthly mean, 60.1, at Keokuk, Iowa; maximum, 97, at Willow Springs, 30th; minimum, 32, at Platt River and Princeton, 5th, and at Fayette, 6th; greatest local monthly range, 63, at Willow Springs; least local monthly range, 32, at Windsor.

**Precipitation.**—Greatest monthly, 8.09, at Cassville; least monthly, 1.15, at Craig.

**Wind.**—Prevailing direction, south.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Sergeant, Signal Corps, assistant.*

#### NEBRASKA.

The mean temperature for the month was nearly the normal, but the rainfall was deficient, especially in the western and southwestern parts of the state.

**Temperature.**—Highest monthly mean, 65.0, at Ashland; lowest monthly mean, 50.6, at Fort Niobrara; maximum, 100, at Long Pine; minimum, 14, at Fort Niobrara.

**Precipitation.**—Greatest monthly, 6.75, at West Point; least monthly, 0.56, at Culbertson.

**Wind.**—Prevailing direction, northwest.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.*

#### NEVADA.

**Temperature.**—The mean was 0.6 above the normal; maximum, 105, at El Dorado Canyon, 25th; minimum, 28, at Austin, 11th; greatest local monthly range, 62, at Elko; least local monthly range, 42, at Beowawe; greatest daily range, 40, at Columbus Marsh; least daily range, 10, at Elko.

**Precipitation.**—The average was 0.09 below the normal; greatest monthly, 2.41, at Susanville, Cal.; least monthly, 0.00, at Yount's Ranch.

**Wind.**—Prevailing direction, south.—*Prof. Chas. W. Friend, Carson City, director; H. E. Wilkinson, Corporal, Signal Corps, assistant.*

#### NEW ENGLAND METEOROLOGICAL SOCIETY.

The weather for New England was slightly below the normal in temperature and sunshine, and above in precipitation.

**Temperature.**—Highest monthly mean, 59.9, at Springfield and Westborough; lowest monthly mean, 47.8, at West Jonesport; maximum, 86, at Westborough, 14th; minimum, 22, at Berlin Falls, 12th, and at West Milan, 8d; greatest local monthly range, 55, at Plymouth; least local monthly range, 24, at Block Island; greatest daily range, 55, at Plymouth, 8d; least daily range, 1, at Waterbury, 20th.

**Precipitation.**—Greatest monthly, 10.81, at Bar Harbor; least monthly, 2.48, at Nantucket.

**Wind.**—Prevailing direction, south.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Private, Signal Corps, assistant.*

#### NEW JERSEY.

**Temperature.**—The mean was 1.0 above the normal; highest monthly mean, 66, at Trenton; lowest monthly mean, 57, at Atlantic City; maximum, 87, at Beverly and Oceanic, 19th and 29th, respectively; minimum, 38, at New Brunswick and Newton, 9th; greatest local monthly range, 52, at New Brunswick; least local monthly range, 80, at Ocean City; greatest daily range, 42, at Freehold, 5th; least daily range, 2, at Newark, 6th.

**Precipitation.**—The average was 0.50 below the normal; greatest monthly, 7.17, at Newton; least monthly, 2.60, at Rancocas.

**Wind.**—Prevailing direction, southwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

#### NEW YORK.

**Temperature.**—The temperature was below the normal, except in the lower Hudson valley and on Long Island; maximum, 85, at Geneva, 3d, and at Massena, 25th; minimum, 21, at Potsdam, 2d; greatest local monthly range, 61, at Massena; least local monthly range, 36, at Setauket.

**Precipitation.**—The precipitation was above the average, except at Fort Hamilton, Fort Columbus, and White Plains, where deficiencies were reported.

**Wind.**—Prevailing direction, southwest.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

#### NORTH CAROLINA.

**Temperature.**—Highest monthly mean, 72.4, at Cheraw and Florence; lowest monthly mean, 57.3, at Highlands; maximum, 96, at Chapel Hill, 24th; minimum, 26, at Highlands, 8th; greatest local monthly range, 60, at Douglas; least local monthly range, 27, at Hatteras.

**Precipitation.**—Greatest monthly, 8.00, at Lumberton; least monthly, 1.85, at Clear Creek.

**Wind.**—Prevailing direction, southwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Hermann, Sergeant, Signal Corps, assistant.*

#### NORTH AND SOUTH DAKOTA.

**Temperature.**—The mean was about 2.5 below the normal; highest monthly mean, 56.2, at Canton, S. Dak.; lowest monthly mean, 45.6, at Gallatin, N. Dak.; maximum, 96, at Alexandria, Wolsey, and Woonsocket, S. Dak., 29th; minimum, 15, at Aberdeen, S. Dak., 9th, at Rapid City, S. Dak., 12th, and at New England City, N. Dak., 15th; greatest local monthly range, 75, at Rapid City, S. Dak.; least local monthly range, 55, at Spearfish, S. Dak.

**Precipitation.**—The monthly average was 0.92 below the normal; greatest monthly, 4.85, at Flandreau, S. Dak.; least monthly, 0.57, at Bismarck, N. Dak.

**Wind.**—Prevailing direction, northwest.—*S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.*

#### OHIO.

**Temperature.**—The means of the northern section, the middle section, the southern section, and of the state were 1.9, 1.3, 0.9, and 1.4, respectively, below the average for the sections and state; maximum, 92, at North Lewisburgh and Pomeroy, 30th; minimum, 28, at Newcomerstown, 2d; greatest daily range, 44, at Pomeroy, 17th; least daily range, 4, at Sandusky, 4th.

**Precipitation.**—The averages for the northern section, the middle section, the southern section, and the state, were 2.38, 0.88, 0.51, and 1.25, respectively, above the normal for the sections and state; greatest monthly, 8.70, at Carrollton; least monthly, 3.39, at Georgetown.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Corporal, Signal Corps, assistant.*

#### OREGON.

**Temperature.**—Maximum, 98, at Grant's Pass, 23d; minimum, 24, at North Powder and Burns, 26th, 27th, and 30th; highest monthly mean, 63.4, at Hood River; lowest monthly mean, 52.9, at Joseph.

**Precipitation.**—The average was about 1.00 below the normal; greatest monthly, 3.24, at La Grande; least monthly, 0.19, at Hood River.

**Wind.**—Prevailing direction, northwest.—*Hon. H. E. Hayes, Master State Grange, Oswego, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

#### PENNSYLVANIA.

**Temperature.**—The mean was 1.0 below the normal; highest monthly mean, 63.9, at Annville; lowest monthly mean, 52.5, at Eagle's Mere; maximum, 89, at Wilkes Barre, 31st; minimum, 23, at Nisbet, 1st; greatest local monthly range, 81.7, at Selin's Grove; least local monthly range, 15, at Eagle's Mere; greatest daily range, 48, at Lewistown, 18th; least daily range, 1, at Le Roy, 30th.

**Precipitation.**—The average was 3.50 above the normal; greatest monthly, 12.41, at Girardville; least monthly, 2.96, at Philadelphia.

**Wind.**—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

#### SOUTH CAROLINA.

**Temperature.**—Highest monthly mean, 74.0, at Trial; lowest monthly mean, 68.2, at Evergreen; maximum, 95, at Chester, 29th; minimum, 30, at Spartanburgh, 8th; greatest local monthly range, 62, at Spartanburgh; least local monthly range, 32, at Camden and Port Royal.

**Precipitation.**—Greatest monthly, 9.08, at Evergreen; least monthly, 2.66, at Port Royal.

**Wind.**—Prevailing direction, southwest.—*Hon. A. P. Butler, Columbia, director; G. E. Hunt, Corporal, Signal Corps, assistant.*

#### TENNESSEE.

The month was characterized by an abnormal rainfall during the first half, and a period of low temperature during the first week, culminating in light frost throughout the state.

**Temperature.**—The mean was nearly the normal for the last eight years; highest monthly mean, 71.5, at Woodstock; lowest monthly mean, 62.3, at Grief and Lawrenceburgh; maximum, 92, at Waynesborough, 12th, at Cog Hill, 29th, and at Fayetteville and Dyersburgh, 81st; minimum, 32, at Lawrenceburgh and Waynesborough, 8th; the daily ranges of temperature were very nearly the normal.

**Precipitation.**—The average was the greatest during the last eight years; greatest monthly, 7.23, at Jacksboro; least monthly, 2.80, at Cog Hill.

**Wind.**—Prevailing direction, south.—*J. D. Plunket, M. D., Nashville, director; H. C. Rate, Signal Corps, assistant.*

#### TEXAS.

**Temperature.**—The mean was about normal over the eastern portion of the state and along the coast, where the greatest departure noted was a deficiency of 1; over the Panhandle and western portion of the state an excess of from 2 to 3 was noted; highest monthly mean, 81, at Rio Grande City; lowest monthly mean, 63.8, at Mountain Spring; maximum, 100, at Rio Grande City, 31st; minimum, 36, at Fort Elliott, 16th; greatest monthly range, 54, at Fort Elliott; least monthly range, 22, at Galveston.

**Precipitation.**—The average was decidedly in excess of the normal in all parts of the state, except in the extreme western portion, where a slight deficiency occurred, and in some localities in eastern Texas, where the deficiency was very marked; greatest monthly, 7.90, at Waco; least monthly, trace, at El Paso.—*D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*

*Meteorological record of Army post surgeons, voluntary, and other co-operating observers, May, 1890.*

| Stations.               | Temperature.<br>(Fahrenheit.) |      |       |      | Precip'n. |  | Stations.               | Temperature.<br>(Fahrenheit.) |      |       |      | Precip'n. |
|-------------------------|-------------------------------|------|-------|------|-----------|--|-------------------------|-------------------------------|------|-------|------|-----------|
|                         | Max.                          | Min. | Mean. |      |           |  |                         | Max.                          | Min. | Mean. |      |           |
| Alabama.                | 0                             | 0    | 0     | Ins. |           |  | Arkansas—Cont'd.        | 0                             | 0    | 0     | Ins. |           |
| Bermuda *.....          | 86                            | 47   | 69.2  | 4.36 |           |  | Stuttgart.....          | 89                            | 47   | 69.8  | 6.00 |           |
| Citronelle.....         | 92                            | 46   | 74.2  | 7.47 |           |  | Texaskana.....          | 94                            | 48   | 72.0  | 6.42 |           |
| Columbiana.....         | 88                            | 38   | 69.1  | 5.06 |           |  | Washington.....         | 100                           | 49   | 73.1  | 9.27 |           |
| Decatur (1).....        | 91                            | 34   | 68.1  | 7.39 |           |  | Winslow.....            | 80                            | 42   | 64.8  | 6.57 |           |
| Decatur (2).....        | 94                            | 36   | 68.6  | 5.37 |           |  | British Columbia.       |                               |      |       |      |           |
| Double Springs.....     | 91                            | 34   | 68.1  | 7.39 |           |  | New Westminster.        | 76                            | 43   | 56.9  | 3.04 |           |
| Enfauila.....           | 88                            | 46   | 72.6  | 8.93 |           |  | California.             |                               |      |       |      |           |
| Evergreen.....          | 91                            | 50   | 71.8  | 6.08 |           |  | Alcatraz Island.....    | 73                            | 40   | 56.1  | 0.64 |           |
| Fort Deposit.....       | 91                            | 44   | 72.2  | 6.09 |           |  | Angel Island.....       | 80                            | 42   | 57.7  | 1.20 |           |
| Livingston (1).....     | 87                            | 45   | 70.3  | 4.15 |           |  | Aranta.....             |                               |      |       | 2.05 |           |
| Livingston (2).....     | 88                            | 42   | 68.0  | 7.59 |           |  | Arch Beach.....         | 78                            | 58   | 60.0  |      |           |
| Marion.....             | 88                            | 37   | 68.0  | 3.30 |           |  | Baratow.....            | 104                           | 40   | 71.0  | 0.00 |           |
| Mt. Vernon B'ks.....    | 90                            | 45   | 71.2  | 5.38 |           |  | Benicia Barracks.....   | 100                           | 45   | 62.5  | 0.88 |           |
| Opelika.....            | 93                            | 42   | 71.2  | 5.55 |           |  | Berkeley.....           | 82                            | 45   | 57.5  | 1.44 |           |
| Pine Apple.....         | 95                            | 43   | 71.6  | 5.07 |           |  | Campo.....              | 66                            | 46   |       | 0.90 |           |
| Selma (2).....          | 91                            | 49   | 73.5  | 3.92 |           |  | Centerville.....        | 100                           | 54   | 66.4  | 1.08 |           |
| Tusculumbia (2).....    | 90                            | 38   | 67.8  | 3.87 |           |  | Colegrove.....          |                               |      |       | 0.08 |           |
| Valley Head.....        | 90                            | 38   | 65.3  | 4.78 |           |  | Crescent City.....      |                               |      |       | 0.52 |           |
| Alaska.                 |                               |      |       |      |           |  | Evergreen.....          |                               |      |       | 1.50 |           |
| Juneau.....             | 68                            | 36   | 48.0  | 4.85 |           |  | Fort Bidwell.....       | 86                            | 72   | 58.1  | 1.07 |           |
| Arizona.                |                               |      |       |      |           |  | Fort Gaston.....        | 101                           | 38   | 63.3  | 1.57 |           |
| Antelope Valley.....    |                               |      |       | 0.00 |           |  | Fort Mason.....         | 79                            | 46   | 57.9  | 1.02 |           |
| Ash Creek.....          |                               |      |       | T.   |           |  | Georgetown.....         | 89                            | 38   | 59.4  | 4.66 |           |
| Ash Springs.....        |                               | 64   | 73.6  |      |           |  | Grass Valley.....       |                               |      |       | 3.44 |           |
| Bisbee.....             |                               |      |       | 0.00 |           |  | Hydesville.....         | 86                            | 39   | 56.7  | 1.58 |           |
| Chiri Cahua M't's.....  |                               |      |       | 0.00 |           |  | Iowa Hill.....          | 91                            | 40   | 62.9  | 3.46 |           |
| Cooley's Springs.....   |                               |      |       | 0.04 |           |  | Jolon.....              | 88                            | 50   | 65.7  | 0.30 |           |
| Dragoon.....            |                               |      |       | 0.00 |           |  | Lewis Creek.....        | 100                           | 51   | 71.4  | 0.55 |           |
| Dos Cabezos.....        |                               |      |       | 0.00 |           |  | Los Banos (1).....      | 99                            | 54   | 70.2  | 0.33 |           |
| Eagle Pass.....         |                               | 53   | 66.3  | 0.00 |           |  | Los Gatos (2).....      |                               |      |       | 1.30 |           |
| Fairbank.....           |                               |      |       | 0.00 |           |  | National City.....      | 79                            | 55   | 61.2  | 0.41 |           |
| Florence.....           | 108                           | 48   | 76.2  | 0.00 |           |  | Oakland (1).....        | 87                            | 47   | 59.7  | 1.17 |           |
| Fort Apache.....        | 94                            | 36   | 62.7  | 0.00 |           |  | Pasadena.....           | 92                            | 37   | 64.1  | 0.29 |           |
| Fort Bowie.....         | 92                            | 52   | 71.2  | 0.00 |           |  | Pineville.....          | 91                            | 37   | 59.9  | 3.61 |           |
| Fort Huachuca.....      | 95                            | 47   | 71.2  | 0.00 |           |  | Presidio of S. F.....   | 80                            | 43   | 56.8  | 1.44 |           |
| Fort Grant.....         | 92                            | 50   | 69.6  | 0.01 |           |  | Riverside.....          | 96                            | 38   | 62.5  | 0.77 |           |
| Fort Lowell.....        | 105                           | 44   | 71.9  | 0.00 |           |  | Sacramento (1).....     | 88                            | 42   | 62.0  | 2.10 |           |
| Fort McDowell.....      | 108                           | 45   | 75.4  | 0.00 |           |  | Salinas (1).....        | 76                            | 48   | 57.2  | 0.65 |           |
| Fort Mojave.....        | 107                           | 51   | 78.4  | 0.00 |           |  | San Diego B'ks.....     | 76                            | 49   | 62.5  | 0.24 |           |
| Fort Verde.....         | 100                           | 41   | 68.9  | 0.00 |           |  | Santa Barbara (1).....  | 91                            | 44   | 60.0  | 0.18 |           |
| Gila Bend.....          | 102                           | 54   | 84.0  | 0.00 |           |  | Santa Clara.....        | 89                            | 47   | 61.4  | 0.73 |           |
| Grand Central Mill..... |                               |      |       | 0.00 |           |  | Sonoma.....             | 94                            | 44   | 61.2  | 1.12 |           |
| Holbrook.....           | 92                            | 33   | 62.4  | 0.00 |           |  | Steeles.....            | 87                            | 47   | 60.6  | 0.40 |           |
| Mount Huachuca.....     | 99                            | 47   | 70.4  | 0.00 |           |  | Stockton (1).....       |                               |      |       | 0.55 |           |
| Natural Bridge.....     |                               |      |       | 0.01 |           |  | Susanville.....         | 89                            | 33   | 60.1  | 1.51 |           |
| New River.....          | 100                           | 45   | 72.2  | 0.00 |           |  | Vacaville (1).....      | 98                            | 48   | 65.9  | 1.63 |           |
| Phoenix (2).....        | 100                           | 48   | 73.4  | 0.00 |           |  | Walla Walla Ck.....     | 87                            | 32   | 58.4  | 1.29 |           |
| San Carlos.....         |                               | 41   |       | 0.00 |           |  | Walnut Creek.....       | 101                           | 43   | 62.5  | 0.45 |           |
| Show Low.....           |                               |      |       | 0.00 |           |  | Whiteland.....          | 102                           | 45   | 65.4  | 1.84 |           |
| Signal.....             | 105                           | 47   | 69.9  | 0.00 |           |  | Canada.                 |                               |      |       |      |           |
| Tevison.....            |                               |      |       | 0.00 |           |  | McGill Col. Obser-      |                               |      |       |      |           |
| Tip Top.....            |                               |      |       | 0.00 |           |  | vatory, Montreal.       | 74                            | 28   | 51.6  | 4.85 |           |
| Tombstone.....          | 99                            | 50   | 71.8  | 0.00 |           |  | Colorado.               |                               |      |       |      |           |
| Tucson (1).....         | 105                           | 50   | 76.0  | 0.00 |           |  | Abbott.....             | 61                            | 21   | 39.1  | 1.13 |           |
| Walnut Ranch.....       |                               |      |       | 0.00 |           |  | Alma.....               | 86                            | 37   | 59.0  | 0.13 |           |
| Arkansas.               |                               |      |       |      |           |  | Apishapa.....           |                               |      |       | 0.73 |           |
| Arkansas City.....      |                               |      |       | 6.73 |           |  | Box Elder.....          |                               |      |       | 0.33 |           |
| Brinkley.....           | 88                            | 40?  | 67.1  | 4.78 |           |  | Brandon.....            |                               |      |       |      |           |
| Camden.....             | 87                            | 48   | 69.7  | 4.77 |           |  | Breckenridge.....       | 74                            | 11   | 41.2  |      |           |
| Conway.....             | 89                            | 52   | 69.5  | 6.50 |           |  | Brush.....              |                               |      |       | 0.37 |           |
| Dallas.....             | 87                            | 55   |       | 9.10 |           |  | Canon City.....         | 88                            | 38   | 63.0  | 0.50 |           |
| Devall's Bluff.....     | 92                            | 44   | 69.8  | 5.48 |           |  | Castle Rock.....        | 86                            | 31   | 54.8  | 1.81 |           |
| Forrest City.....       | 88                            | 48   | 70.4  | 6.26 |           |  | Chromo.....             |                               |      |       | 0.23 |           |
| Fulton.....             |                               |      |       | 3.49 |           |  | Climax.....             | 58                            | 18   | 36.0  | 2.35 |           |
| Harrisburgh.....        | 88                            | 44   | 69.1  | 4.43 |           |  | Crook.....              |                               |      |       | 0.77 |           |
| Heber.....              | 89                            | 48   | 62.8  | 4.55 |           |  | Cumbres.....            | 62                            | 23   | 43.6  | T.   |           |
| Helena (1).....         |                               |      |       | 5.80 |           |  | Delta.....              | 89                            | 32   | 59.7  | 0.45 |           |
| Helena (2).....         | 90                            | 48   | 70.0  | 4.73 |           |  | Denver (Jes. Col.)..... | 88                            | 32   | 58.4  | 1.30 |           |
| Hot Springs.....        |                               | 43   |       | 6.36 |           |  | Durango (1).....        |                               |      |       | 0.00 |           |
| Lead Hill.....          | 96                            | 42   | 67.0  | 4.08 |           |  | Eagle Farm.....         |                               |      |       | 1.73 |           |
| Little Rock B'ks.....   | 90                            | 45   | 69.8  | 6.39 |           |  | Fort Collins.....       | 85                            | 29   | 56.1  | 1.19 |           |
| Lonoke.....             | 89                            | 50   | 72.7  | 3.68 |           |  | Fort Crawford.....      | 79                            | 30   | 55.4  | 0.17 |           |
| Malvern.....            | 88                            | 42   | 66.1  | 3.70 |           |  | Fort Lewis.....         | 77                            | 25   | 51.6  | 0.10 |           |
| Monticello.....         | 92                            | 48   | 75.2  |      |           |  | Fort Logan.....         | 88                            | 32   | 57.8  | 1.95 |           |
| Newport (1).....        |                               |      |       | 4.20 |           |  | Fort Morgan.....        |                               |      |       | 0.89 |           |
| Newport (2).....        | 92                            | 32   | 67.2  | 4.12 |           |  | Fruita.....             | 93                            | 30   | 66.6  | 0.09 |           |
| Osceola.....            | 89                            | 43   | 68.1  | 6.24 |           |  | Georgetown.....         | 72                            | 28   | 49.4  | 1.12 |           |
| Ozone.....              | 83                            | 45   | 66.4  | 9.65 |           |  | Greeley.....            | 88                            | 33   | 55.6  | 1.21 |           |
| Pine Bluff.....         | 92                            | 42   | 71.8  | 5.73 |           |  | Gunnison.....           | 79                            | 22   | 49.1  | 0.00 |           |
| Prescott.....           | 90                            | 50   | 70.8  | 8.18 |           |  | Hardin.....             |                               |      |       | 0.96 |           |
| Russellville.....       | 91                            | 44   | 70.4  | 4.36 |           |  | Husted.....             | 85                            | 30   | 54.5  | 1.06 |           |